

# NuForce HA-200



## FCC Notice - Declaration of Conformity Information

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

**WARNING:** Only peripherals complying with the FCC class B limits may be attached to this equipment.

Changes or modifications made to this equipment, not expressly approved by us or parties authorized by us could void the user's authority to operate the equipment. This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

## SAFETY INSTRUCTIONS

There are two categories of Safety Instructions included in this manual:

- Product Warnings, (i.e., what must never be done to assure avoiding those hazards that could cause bodily injury or property damage); and
- User Directions (i.e., what must always be done to assure the safe use of your device).

The Safety Instructions contained in this manual have been categorized in accordance with the seriousness of the potential hazards through the use of Signal Words. Those Signal Words, and their intended meanings, are as follows:

**DANGER:** Indicates that a failure to observe the Safety Instructions could result in death or catastrophic bodily injury.

**WARNING:** Indicates that a failure to observe the Safety Instructions could result in serious bodily injury.

**CAUTION:** Indicates that a failure to observe the Safety Instructions could result in minor bodily injury or property damage.

**NOTE:** Designates important information that relates to activities and/or conditions that might result in loss of data and/or damage to your device.

## Safe Use and Operation of Your Device

This equipment emits stray RF energy and will interfere with the reception of signals by airborne electronic navigational devices or medical devices. Do not operate this equipment near any sensitive medical devices.

**WARNING: Use only grounded AC power cords.**

Always immediately disconnect the power to the equipment in the event the device emits an unusual odor or sound or generates smoke.

**WARNING:** Never attempt to disassemble, repair or make any modification to your device. Disassembly, modification or any attempt at repair could cause bodily injury or property damage, as well as damage to the device itself.

**WARNING:** Your device is not a toy. Never allow children to play with your device. Misuse, rough or improper handling of your device by children could result in serious bodily injury for any of the enumerated safety warnings in this manual. In addition, always keep all accessories and components out of the reach of small children as small parts might present a choking

hazard. Seek immediate medical attention if choking occurs or if any small part has been swallowed.

**CAUTION:** Never raise the sound volume level too high when using your device with earphones. An excessive sound volume level could cause damage to your hearing.

**WARNING:** To reduce the risk of fire or electric shock, do not expose the unit to moisture or water.

Do not allow foreign objects to get into the enclosure. If the unit is exposed to moisture, or a foreign object gets into the enclosure, immediately disconnect the power cord from the wall. Take the unit to a qualified service person for inspection and necessary repairs.

Read all the instructions before connecting or operating the component.

Keep this manual so you can refer to these safety instructions.

Heed all warnings and safety information in these instructions and on the product itself. Follow all operating instructions.

Do not use this unit near water.

You must allow a minimum 10 cm or 4 inches of unobstructed clearance around the unit. Do not place the unit on a bed, sofa, rug, or similar surface that could block the ventilation openings. If the unit is placed in a bookcase or cabinet, there must be ventilation of the cabinet to allow proper cooling. Keep the component away from radiators, heat registers, stoves, or any other appliance that produces heat.

The unit must be connected to a power supply only of the type and voltage specified on the rear panel.

Connect the component to the power outlet only with the supplied power supply cable or an exact equivalent. Do not modify the supplied cable.

Do not route the power cord where it will be crushed, pinched, bent, exposed to heat, or damaged in any way. Pay particular attention to the power cord at the plug and where the cord exits the back of the unit.

The power cord should be unplugged from the wall outlet during a lightning storm or if the unit is to be left unused for a long period of time.

Immediately stop using the component and have it inspected and/or serviced by a qualified service agency if:

- The power supply cord or plug has been damaged.
- Objects have fallen or liquid has been spilled into the unit.
- The unit has been exposed to rain.
- The unit shows signs of improper operation.
- The unit has been dropped or damaged in any way.

## Introduction

The NuForce HA-200 is a high performance, Single Ended, Class-A Headphone Amplifier engineered to satisfy the requirements of the most devout headphone enthusiast.

As personal music listening and headphone use has become an ever-greater part of the audio market, the desire for uncompromised headphone amplification among devout enthusiasts has increased accordingly. The HA-200 was developed to specifically meet this need by uniting the most musically accurate technology available along with renowned NuForce value.

As an ultimate high-performance headphone amplifier, the HA-200 starts out with Class-A design and then combines that with a constant current output topology. Furthermore, when it is operated in classic Stereo Mode it also offers true Single-Ended (SE) output performance. As a valuable plus, two units can easily be combined to provide true Balanced Headphone Mode operation, which quadruples the available output power (2X voltage = 4X power) while increasing transient speed and dynamic control over the music.

## Class-A Topology:

The Class-A topology is widely recognized as being the purest form of amplification, and this is because other topologies such as Class B and Class-AB require that two output devices be operated in "push-pull" fashion in order for each to handle one half of the musical waveform. At the point where a given device "hands off" to its opposing counterpart, it must "turn off" or stop conducting current until the waveform polarity ultimately returns to that which the device was assigned to handle. Then and only then will that device begin to conduct current again, while in turn, the opposing device must now stop conducting. This "sharing of polarity" behavior leads to what is commonly termed "crossover" or "notch" distortion.

Due to the battery-like type of charge storage within them and their inherent speed limitations, the transition between opposing output devices can never be perfectly aligned in time to produce a seamless flow of electrical current. Typically, a small discontinuity or "notch" at the zero-crossing (crossover) point can always be observed by an oscilloscope connected to the output terminals of the amplifier. This notch represents distortion and is of a static nature, meaning its amplitude remains the same at all signal levels. Therefore, this distortion represents an ever-increasing percentage of the total output as power levels are reduced, and contributes to a "grainy" sound that is particularly audible and quite irritating at low listening levels.

Conversely, in Class-A operation the output device is never completely shut off, so there is no "turn on" or "turn off" time requirement, per se. Hence, there are no issues with charge storage or any ensuing crossover distortion. Class-A designs generally offer better high frequency performance and over-all feedback loop stability. This second point is especially important because all amplifiers produce some distortion, but compared to other topologies Class-A's superior feedback loop stability means that fewer high-order distortion

harmonics are generated. The result is a more natural and harmonically accurate reproduction that is significantly less fatiguing.

### **Single-Ended (SE) Design:**

One unique advantage of Class-A design is the ability to employ only a single output device, with the technique commonly referred to as Single-Ended design. Quite simply, such a configuration guarantees that there is no opportunity for the generation of crossover distortion, and therefore is considered by many to be the purist form of amplification possible. The HA-200 operates in full SE Mode when used in its stock stereo configuration.

### **Balanced Headphone Mode:**

Unique to the HA-200 is its ability to quadruple output power by simply adding a second unit and operating them together in "Balanced Headphone Mode." For this configuration, all that's needed is to use the XLR inputs and outputs on each HA-200 along with a Balanced headphone cable available from your local or online Headphone Specialty Stores for connecting the headphones.

In Balanced Mode, four completely separate amps (2 per unit) are utilized to drive the four phases of the music signal (right normal, right inverted, left normal, left inverted). Please keep in mind though that this is NOT the same technique as mentioned above in the "push-pull" Class-B scenario. In Balanced Mode, all transistors are biased in Class-A so as to conduct current at all times - only the phase is inverted 180 degrees in the case of the left & right inverting amplifiers.

The primary benefit of such a design is that the available output voltage is doubled, so the actual output power is quadrupled. It also doubles the effective slew rate (the maximum change in voltage per second that an amplifier can achieve), as both amplifiers are operating in opposite phase to increase the dynamic realism of the music. While "technically" not a pure SE design, since Balanced Mode remains in full Class-A operation at all times it can be thought of as a "dual SE" architecture that retains the best of SE performance with the added benefits of higher power and better dynamic control.

Sonically, the resulting sound is completely "grain-free," the soundstage is wide and deep while instruments and voices are reproduced with extreme clarity and purity of tone. The incredible power and dynamic control over the music simply must be experienced to be appreciated.

### **Class-A's Modest Disadvantage:**

The one slight disadvantage that Class-A amplifiers have is that transistor bias current must be set such that the output transistor continually operates in the center of its "linear region," which simply speaking is the midpoint between its fully-on and fully-off limits. Therefore, regardless of the actual audio power being used Class-A amplifiers continuously consume their full-rated output power and dissipate that power in the form of waste heat.

Now in some cases this might be a serious efficiency issue, but mostly in those applications involving loudspeaker amplifiers capable of delivering several hundred watts of power. With headphone amplifiers, this is less of a concern due to their need for significantly less output capability. Nevertheless, while in operation the HA-200 will continuously consume 24W of power. In fact, that value actually exceeds the idle power consumption of a NuForce Reference 18 amplifier! The upshot is that in order to benefit from the superlative performance that the HA-200 has to offer, one must be willing to accept its somewhat lower power efficiency. In our opinion, that's a relatively small price to pay for such a great reward, and we believe that many will agree.

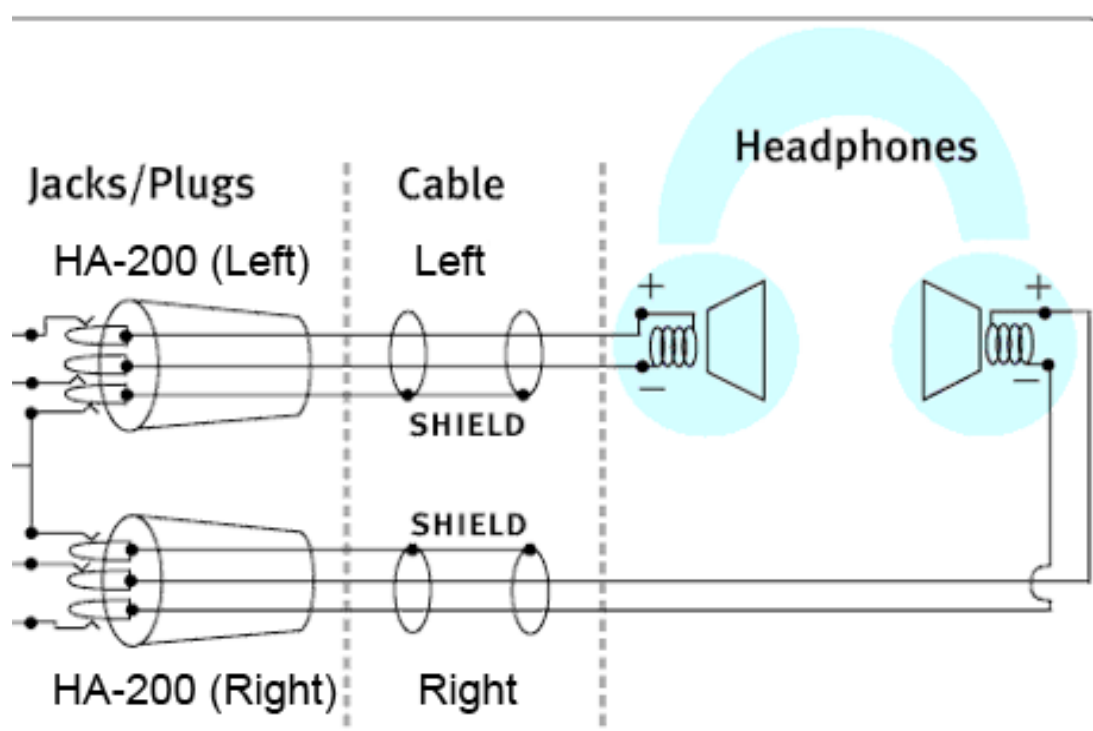
### **Constant Current Output:**

In addition to the Class-A, Single-Ended and Balanced Mode advantages, the HS-200's Constant Current output feature allows it to drive difficult headphone loads and/or headphones exhibiting erratic electrical impedance across the frequency spectrum. The Constant Current topology has the ability to constantly adjust output voltage as the headphone impedance changes with frequency - which is more common than not with most all headphones to some degree. Constant Current operation avoids the extreme performance and available volume variations that often plague other amplifier topologies, and ensures consistently good performance regardless of headphone type and/or impedance. Listeners that use differing types of headphones will greatly appreciate this feature.

### **Other HA-200 Features Include:**

- A single output gain stage (only 1 op-amp and 1 output device in the signal path)
- A high performance Alps volume control
- XLR connectors for operating in "Balanced Headphone Mode" (see above)
- A linear power supply comprised of a custom-made toroidal transformer and extensive capacitor reserves

To be sure, the HA-200 is not a headphone amplifier for the common man or woman. Developed specifically for the devout headphone enthusiast, it's comprehensive design and pristine audio performance is reserved for those that demand nothing less than the very best.



In the 'Balanced Headphone Mode', simply use the XLR input (one on each HA-200) and output.



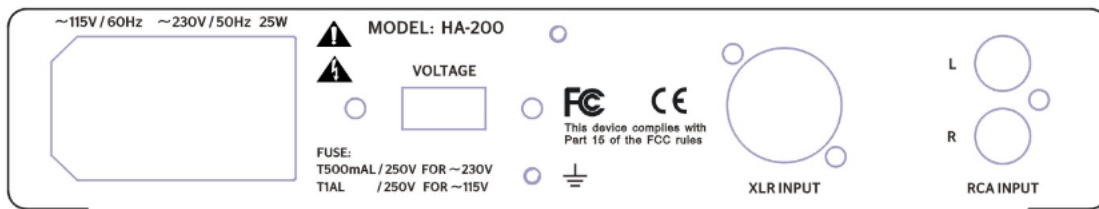
## Quick Start Guide:

**Warning:** Do not connect your headphones to the XLR output when the RCA inputs are used. Use the XLR output only when you combine two HA-200 units in Balance Mode.

### Front Panel



### Back Panel



- ☐ To power on the unit, please turn on the rear AC switch

### Connections:

- ☐ Input:
  - 1 x XLR input
  - 1 x RCA input
- ☐ Output:
  - 1 x XLR output
  - 1 x 6.3mm headphone output

**\*Headphones/earphones differ greatly in their impedance and efficiency. For safety, please make sure that the volume knob is adjusted to the lowest position setting before plugging your headphones/earphones into the 6.3mm headphone output. Then to avoid damage, gradually increase the volume to your desired listening level.**

## **HA-200 Product Specification**

Frequency Response: 10 - 20K Hz

THD+N: 0.0005%

Rated Power Output:

393mW @ 16 ohm

747mW @ 32 ohm

383mW @ 100 ohm

129mW @ 300 ohm

70mW @ 600 ohm

Max Power Output: (Normal stereo, non-balanced mode)

600mW @ 16 ohm

937mW @ 32 ohm

530mW @ 100 ohm

180mW @ 300 ohm

96.3mW @ 600 ohm

SNR: >116 dB

Dimensions:

Height: 44mm (1.73 inches)

Width: 217mm (8.54 inches)

Depth: 231mm (9.10 inches)

Weight: 2.2 Kg (1 pound)

## **NuForce's Limited Warranty and Limitation of Liabilities**

### **ADDITIONAL RIGHTS**

FOR CONSUMERS, WHO ARE COVERED BY CONSUMER PROTECTION LAWS OR REGULATIONS IN THEIR COUNTRY OF PURCHASE OR, IF DIFFERENT, THEIR COUNTRY OF RESIDENCE, THE BENEFITS CONFERRED BY THIS WARRANTY ARE IN ADDITION TO ALL RIGHTS AND REMEDIES CONVEYED BY SUCH CONSUMER PROTECTION LAWS AND REGULATIONS. THIS WARRANTY DOES NOT EXCLUDE, LIMIT OR SUSPEND ANY RIGHTS OF CONSUMERS ARISING OUT OF NONCONFORMITY WITH A SALES CONTRACT. SOME COUNTRIES, STATES AND PROVINCES DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES OR ALLOW LIMITATIONS ON HOW LONG AN IMPLIED WARRANTY OR CONDITION MAY LAST, SO THE LIMITATIONS OR EXCLUSIONS DESCRIBED BELOW MAY NOT APPLY TO YOU. THIS WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS, AND YOU MAY ALSO HAVE OTHER RIGHTS THAT VARY BY COUNTRY, STATE OR PROVINCE. THIS LIMITED WARRANTY IS GOVERNED BY AND CONSTRUED UNDER THE LAWS OF THE COUNTRY IN WHICH THE PRODUCT PURCHASE TOOK PLACE.

### **LIMITED WARRANTY**

For a period of TWO (2) YEARS from the date of retail purchase by the original end-user purchaser ("Warranty Period"), NuForce warrants (i) this product against defects in materials and workmanship, and (ii) that each Product, unmodified and under normal use and conditions, will substantially comply with NuForce' applicable written technical documentation for the Product. NuForce reserves the right to make substitutions and modifications from time to time in the specifications of Products sold by NuForce, provided that such substitutions or modifications do not materially affect overall Product performance.

If a hardware defect exists and a valid claim is received within the Warranty Period, at its option and to the extent permitted by law, NuForce will (1) repair the hardware defect at no charge, using new or refurbished replacement parts, (2) exchange the product with a product that is new or which has been manufactured from new or serviceable used parts and is at least functionally equivalent to the original product, or (3) refund the purchase price of the product. NuForce may request that you replace defective parts with user-installable new or refurbished parts that NuForce provides in fulfillment of its warranty obligation. A replacement product/part assumes the remaining warranty of the original product or ninety (90) days from the date of replacement or repair, whichever provides longer coverage for you. When a product or part is exchanged, any replacement item becomes your property and the replaced item becomes NuForce's property. When a refund is given, your product becomes NuForce's property.

### **OBTAINING WARRANTY SERVICE**

If you purchased the product in the U.S., deliver the product, at your expense, to any NuForce Service Center located in the U.S. If you purchased the product outside of the U.S., deliver the product to any NuForce Authorized Importer in the country where you purchased the product. Be aware, however, that not all countries have NuForce Authorized Service Providers ('NASP') and not all Authorized Service Providers outside the country of purchase have all parts or replacement units for the product. If the product cannot be repaired or replaced in the country it is in, it may need to be sent to a different country or returned to the country of purchase at your expense for repair or replacement. If you seek service in a country that is not the country of original purchase, you will comply with all applicable import and export laws and regulations and be responsible for all custom duties, V.A.T. and other associated taxes and charges. Where international service is available, NuForce may repair or exchange defective products and parts with comparable products and parts that comply with local standards. You can always deliver the product to NuForce's U.S. main service center for obtaining warranty service, however, you may have to pay for return shipping cost.

NuForce may send you user-installable new or refurbished replacement product or parts to enable you to service or exchange your own product ("DIY Service"). Upon receipt of the replacement product or part, the original product or part becomes the property of NuForce and you agree to follow instructions, including, if required, arranging the return of original product or part to NuForce in a timely manner.

When providing DIY Service requiring the return of the original product or part, NuForce may require a credit card authorization as security for the retail price of the replacement product or part and applicable shipping costs. If you follow instructions, NuForce will cancel the credit card authorization, so you will not be charged for the product or part and shipping costs. If you fail to return the replaced product or part as instructed or the replaced product or part is not eligible for warranty service, NuForce will charge the credit card for the authorized amount.

### **EXCLUSIONS AND LIMITATIONS**

This Limited Warranty applies only to hardware products manufactured by or for NuForce that can be identified by the "NuForce" trademark, trade name, or logo affixed to them. The Limited Warranty does not apply to any non-NuForce hardware products or any accessories, even if packaged or sold with NuForce hardware. Non-NuForce manufacturers, suppliers, may provide their own warranties. Other accessories distributed by NuForce under the NuForce brand name are not covered under this Limited Warranty. This warranty does not apply: (a) to damage caused by accident, abuse, misuse, misapplication, liquid contact, fire, earthquake, non-NuForce products, or other external causes; (b) to damage caused by service performed by anyone who is not a NASP; (c) to a product or a part that has been modified without the written permission of NuForce; (d) to consumable parts, such as batteries, or protective coatings designed to diminish over time unless failure has occurred due to a defect in materials or workmanship; (e) to cosmetic damage, including but not limited to scratches, dents, and broken plastic on ports; (f) to defects caused by normal wear and tear or otherwise due to the normal aging of the product; or (g) if any NuForce serial number has been removed or defaced.

Important: Do not open the hardware product. Opening the hardware product may cause damage that is not covered by this warranty. Only NuForce or a NASP should perform service on this hardware product.

THIS WARRANTY AND REMEDIES SET FORTH ABOVE ARE EXCLUSIVE AND IN LIEU OF ALL OTHER WARRANTIES, REMEDIES AND CONDITIONS, WHETHER ORAL OR WRITTEN, EXPRESS OR IMPLIED. NUFORCE SPECIFICALLY DISCLAIMS ANY AND ALL IMPLIED WARRANTIES, INCLUDING, WITHOUT LIMITATION, WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. IF NUFORCE CANNOT LAWFULLY DISCLAIM IMPLIED WARRANTIES UNDER THIS LIMITED WARRANTY, ALL SUCH WARRANTIES, INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE LIMITED IN DURATION TO THE DURATION OF

THIS WARRANTY. No NuForce reseller, agent, or employee is authorized to make any modification, extension, or addition to this warranty.

NUFORCE IS NOT RESPONSIBLE FOR DIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES RESULTING FROM ANY BREACH OF WARRANTY OR CONDITION, OR UNDER ANY OTHER LEGAL THEORY, INCLUDING BUT NOT LIMITED TO LOST PROFITS, DOWNTIME, GOODWILL, DAMAGE TO OR REPLACEMENT OF EQUIPMENT AND PROPERTY, ANY COSTS OF RECOVERING, REPROGRAMMING, OR REPRODUCING ANY PROGRAM OR DATA STORED IN OR USED WITH NUFORCE PRODUCTS, AND ANY FAILURE TO MAINTAIN THE CONFIDENTIALITY OF DATA STORED ON THE PRODUCT. NUFORCE SPECIFICALLY DOES NOT REPRESENT THAT IT WILL BE ABLE TO REPAIR ANY PRODUCT UNDER THIS WARRANTY OR MAKE A PRODUCT EXCHANGE WITHOUT RISK TO OR LOSS OF PROGRAMS OR DATA.

Some states and provinces do not allow the exclusion or limitation of incidental or consequential damages or exclusions or limitations on the duration of implied warranties or conditions, so the above limitations or exclusions may not apply to you. This warranty gives you specific legal rights, and you may also have other rights that vary by state or province.

Proof of purchase in the form of a bill of sale or receipted invoice which is evidence that the unit is within the Warranty period must be presented to obtain warranty service.

REPLACEMENT AS PROVIDED UNDER THIS WARRANTY IS THE EXCLUSIVE REMEDY OF THE CONSUMER. NUFORCE SHALL NOT BE LIABLE FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES FOR BREACH OF ANY EXPRESS OR IMPLIED WARRANTY ON THIS PRODUCT. EXCEPT TO THE EXTENT PROHIBITED BY APPLICABLE LAW, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE ON THIS PRODUCT IS LIMITED IN DURATION TO THE DURATION OF THIS WARRANTY.